



Biomedical Results of ISS Expeditions 1-12

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ISS Expeditions 1-12

- 15 Astronauts on ISS
 - 13 males
 - 2 females
- Average age 47.2 years young
- Average length of mission 175.1 days
 - Longest mission 195.8 days
 - Shortest mission 128.8 days



Biomedical Data

- Data Collect via Medical Requirements
- Assessments consists of:
 - Physiological
 - Performance



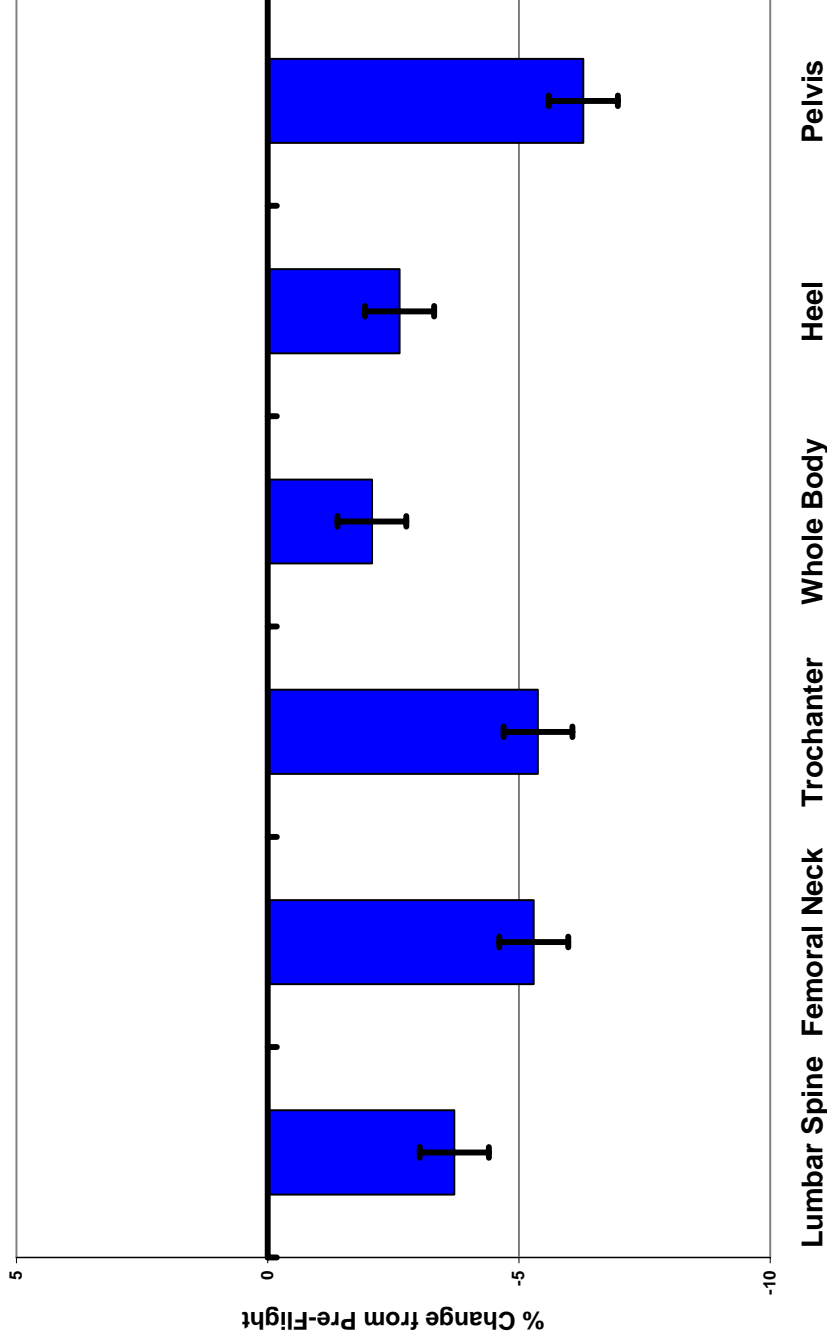
Physiological Assessments

- Skeletal
- Cardiovascular
- Neurovestibular
- Radiation Exposure



Bone Mineral Density

BMD Percent Change from Preflight
Expeditions 1-12 (n=15)

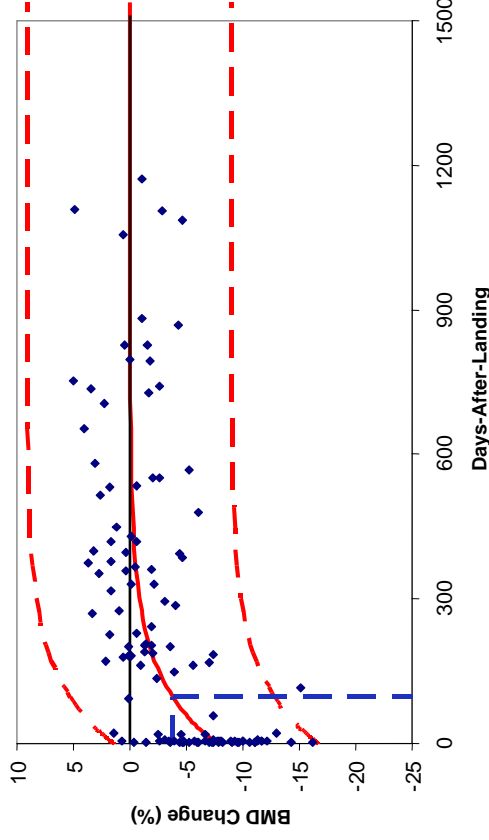




Bone Mineral Density Recovery

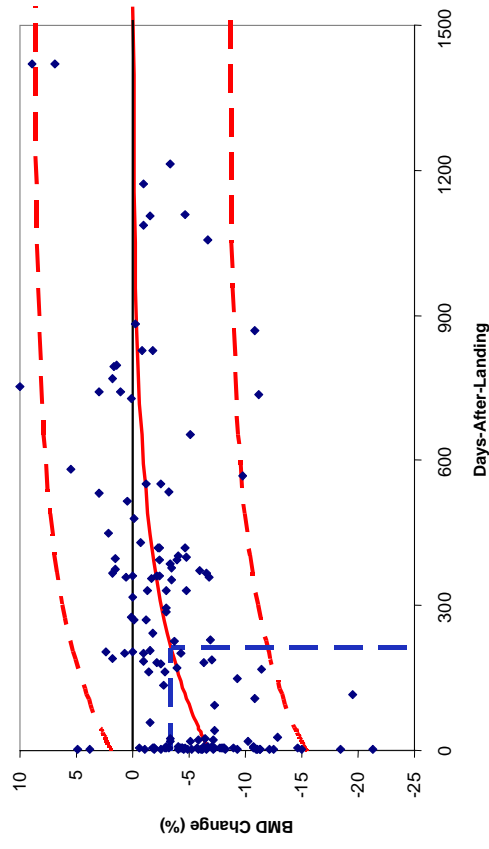
Pelvis

Loss₀=7.7% Recovery Half-life=97 d



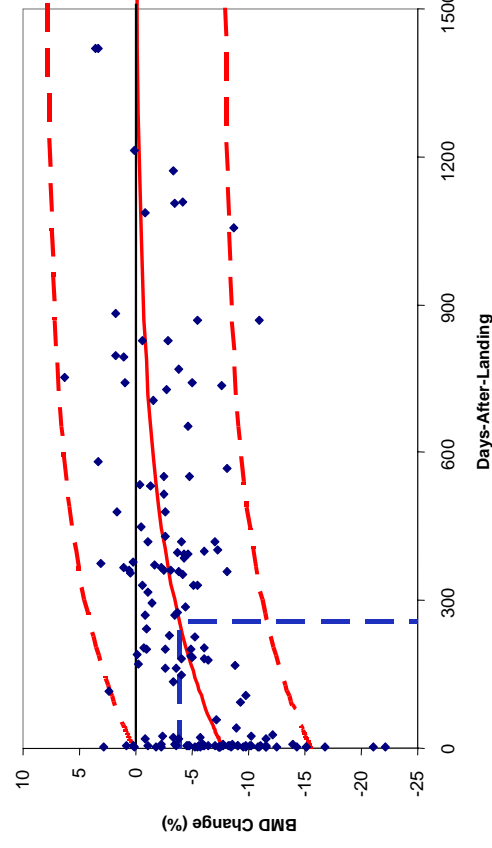
Femoral Neck

Loss₀=6.8% Recovery Half-life=211 d



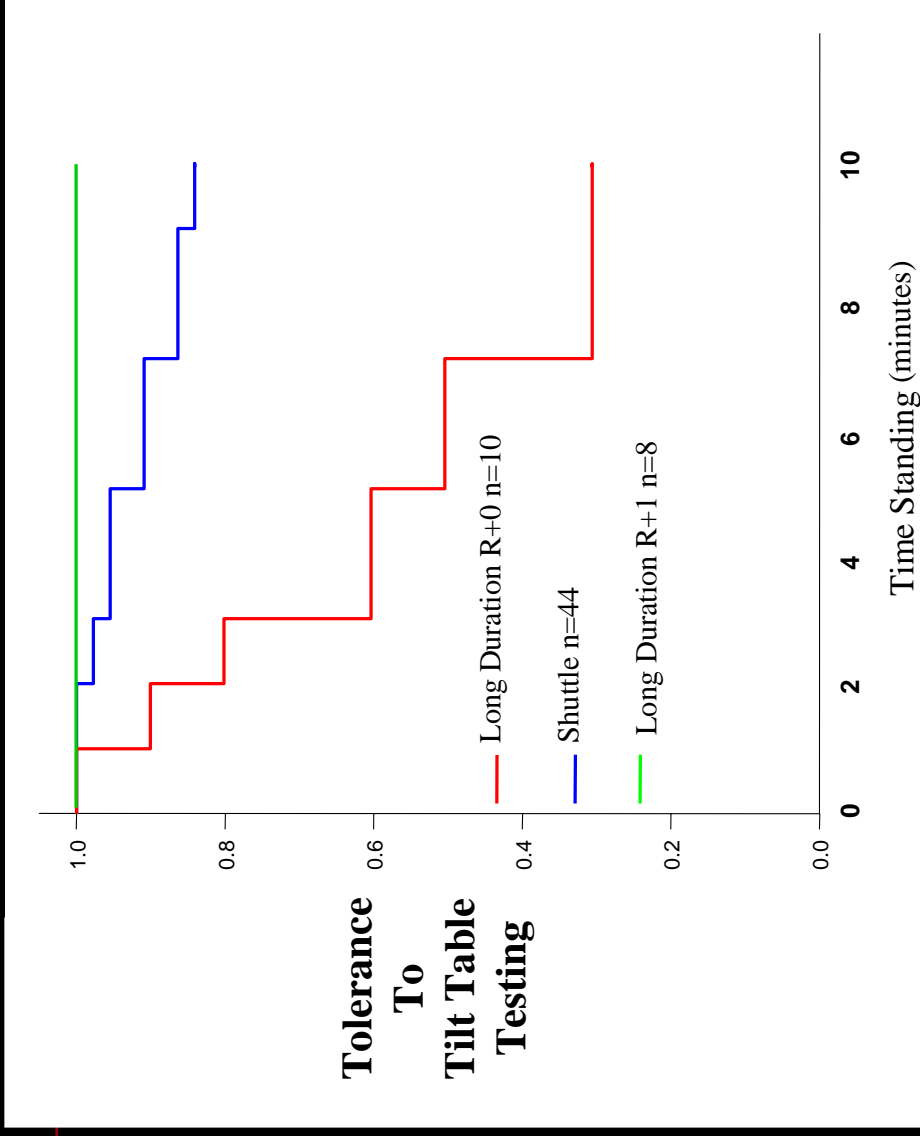
Trochanter

Loss₀=7.8% Recovery Half-life=255 d





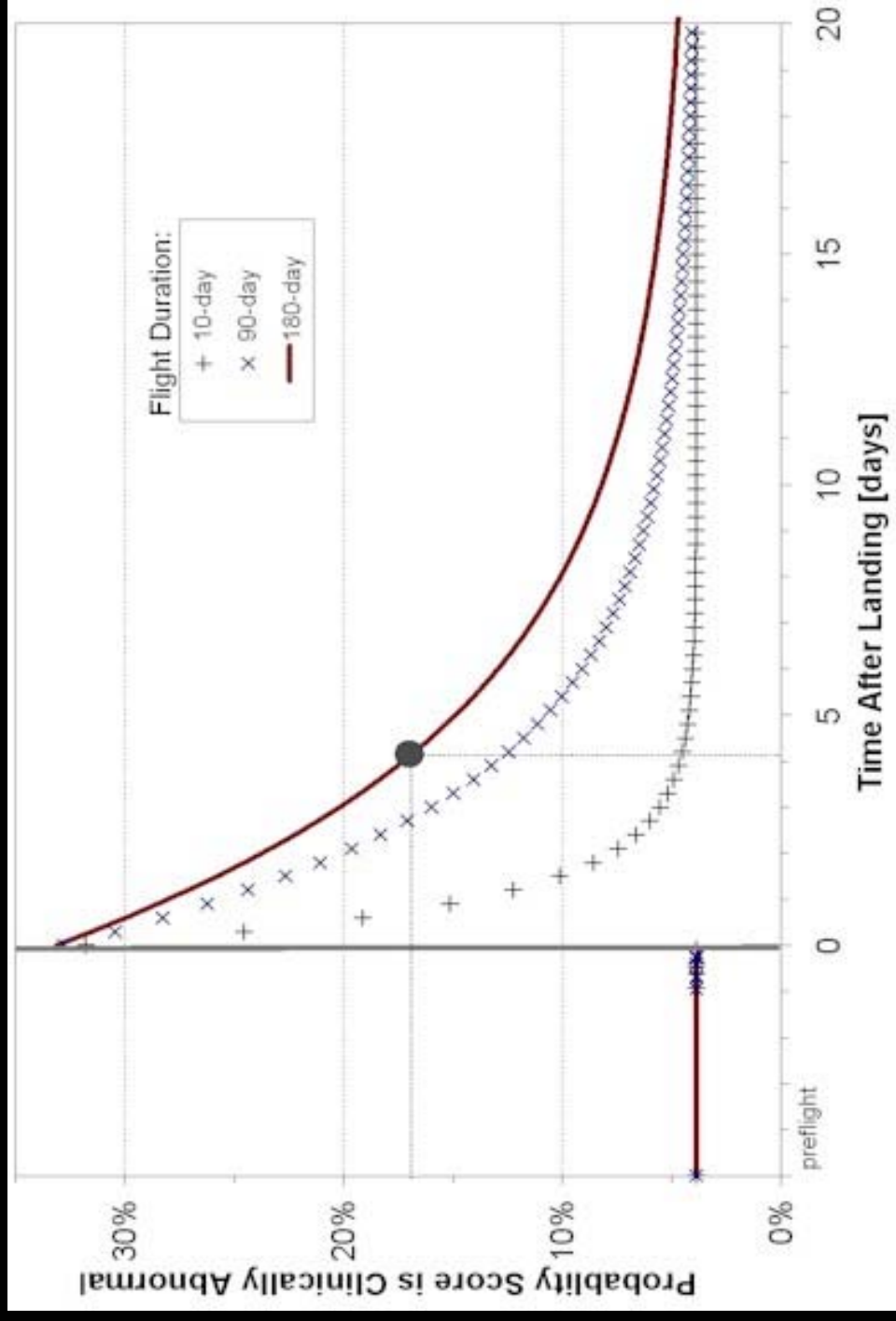
Orthostatic Tolerance



Shuttle vs. Long Duration R+0 = $p < 0.02$
 Long Duration R+0 vs. Long Duration R+1 = $p < 0.03$



Postural Stability Set of Sensory Organ Test 6



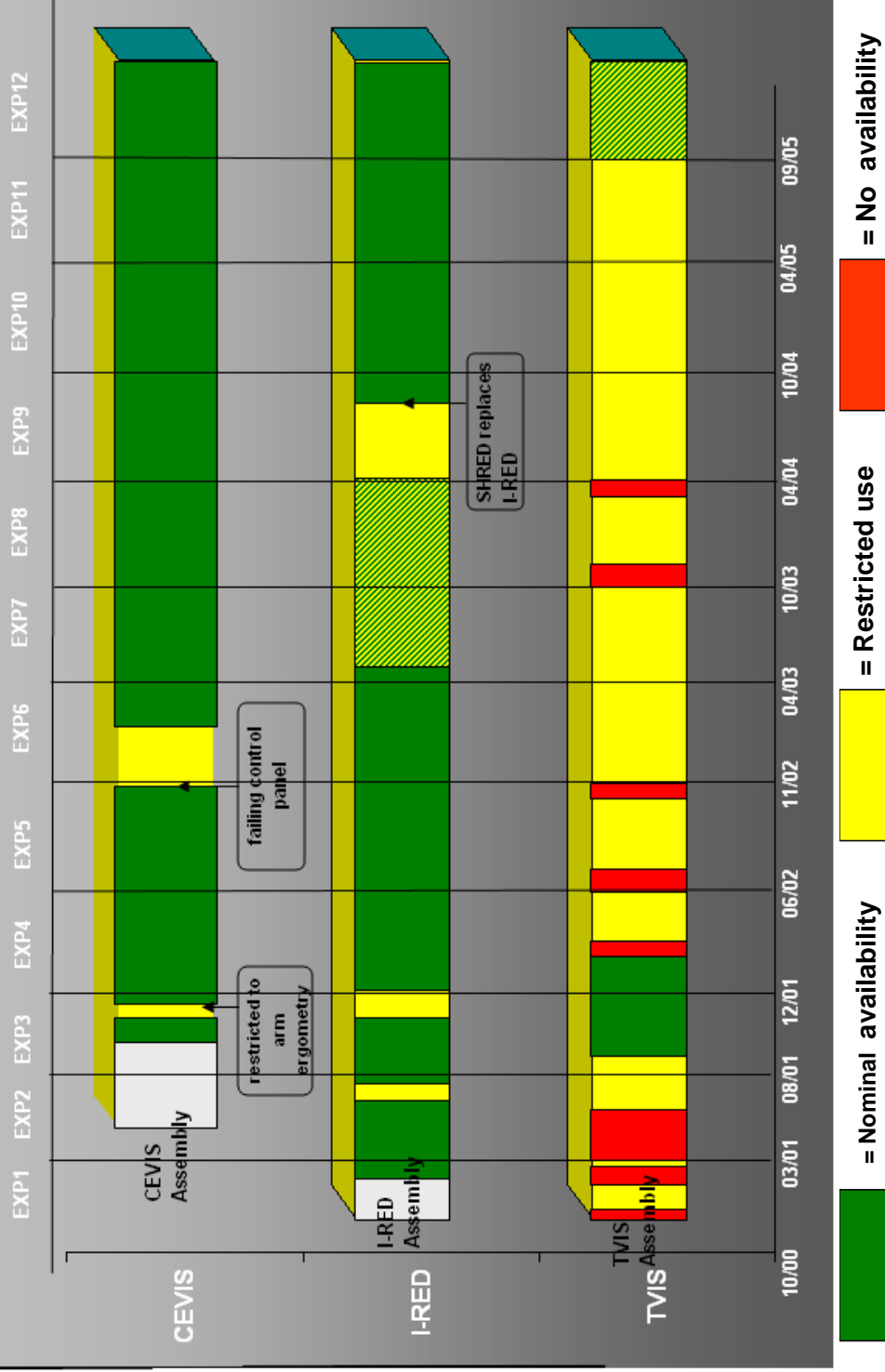


Performance Assessment

- Countermeasure Hardware Assessment
- Aerobic Fitness
 - General
 - Preflight
 - In-flight, Post-flight, and Recovery
- Functional Fitness
 - Strength and Endurance
 - Strength and Flexibility



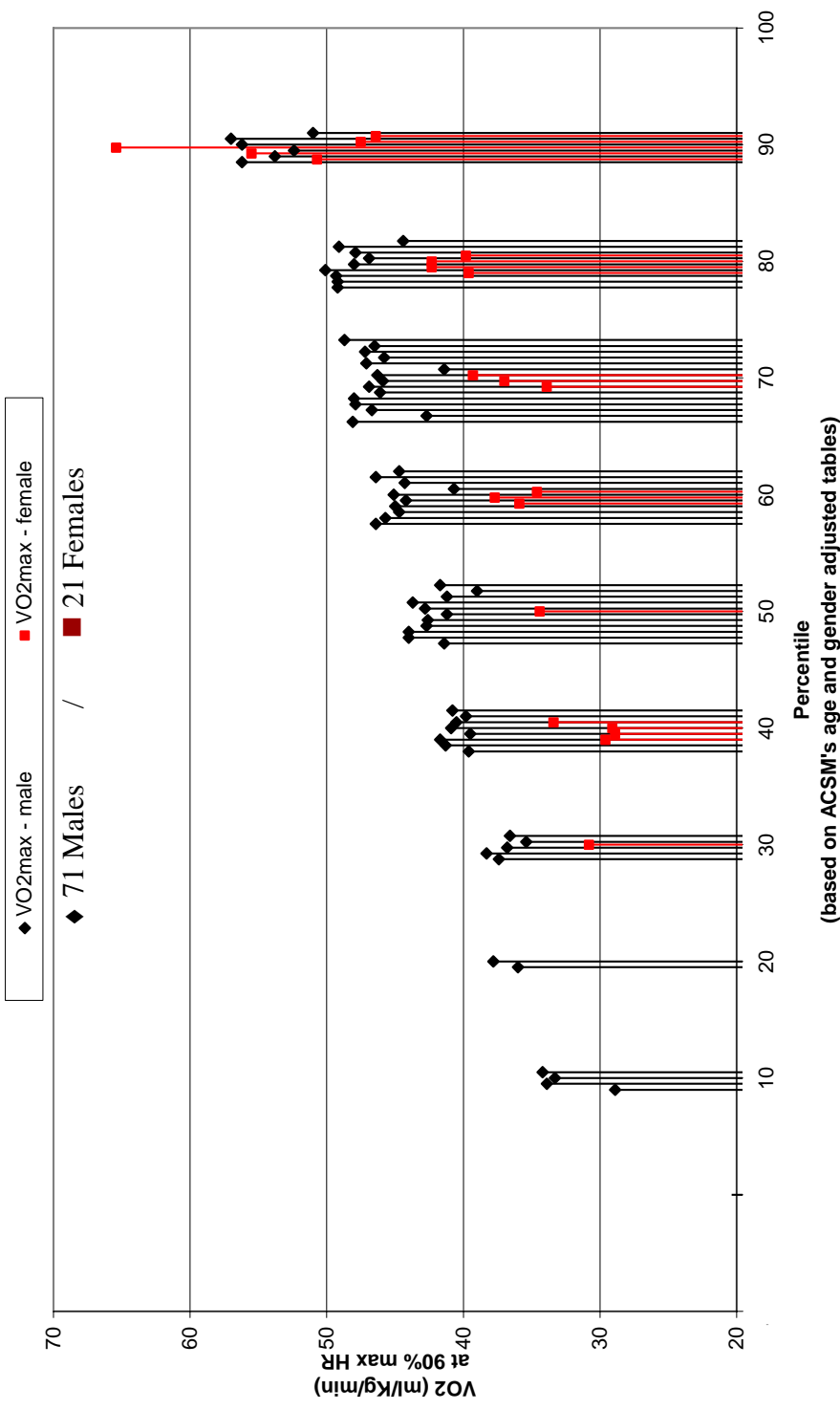
ISS Exercise Hardware Availability Timeline





Aerobic Capacity of the Astronaut Corps

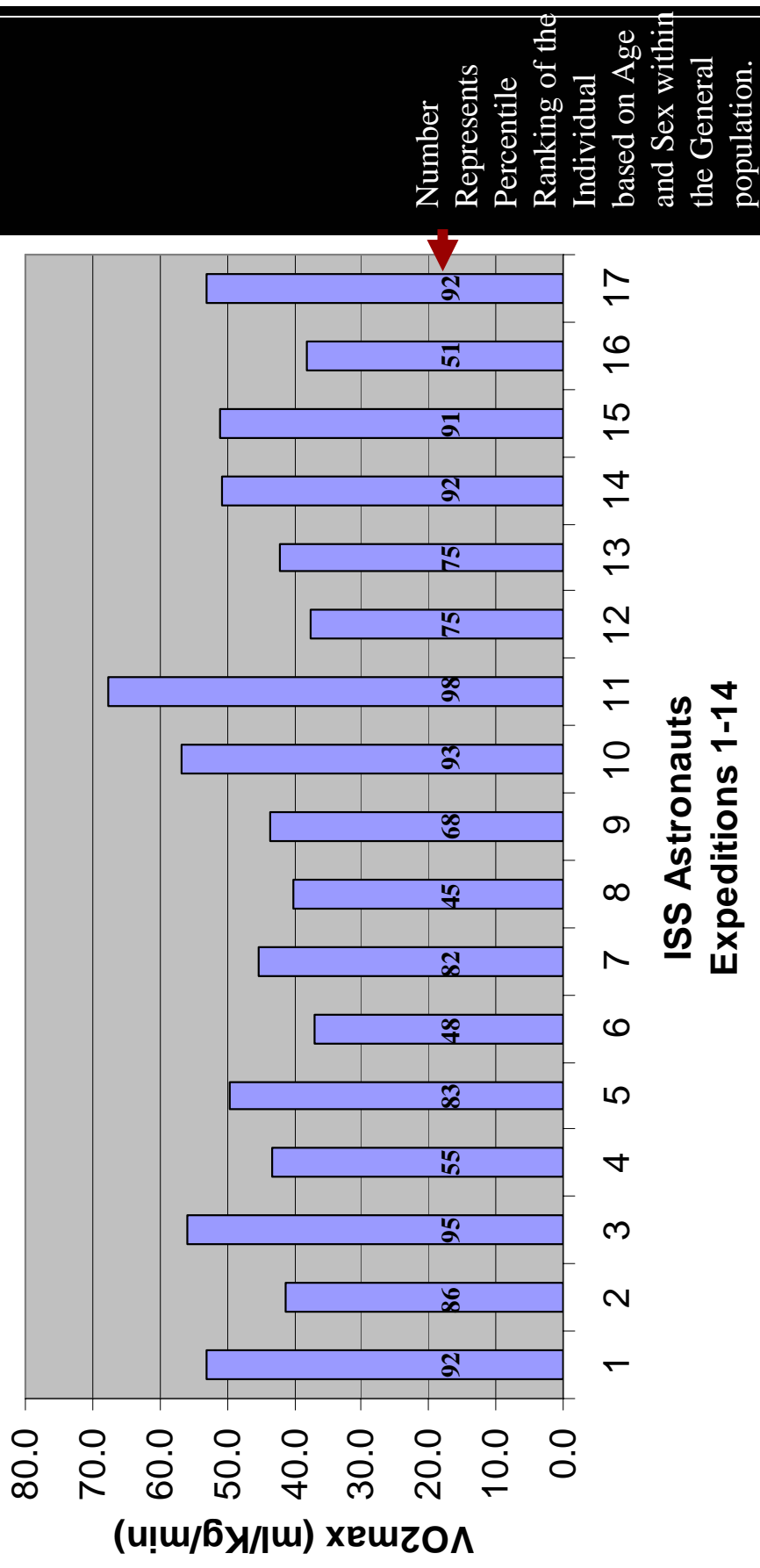
Active Astronaut Corps Aerobic Capacity
(Data from LSAH; Annual Medical Evaluation)





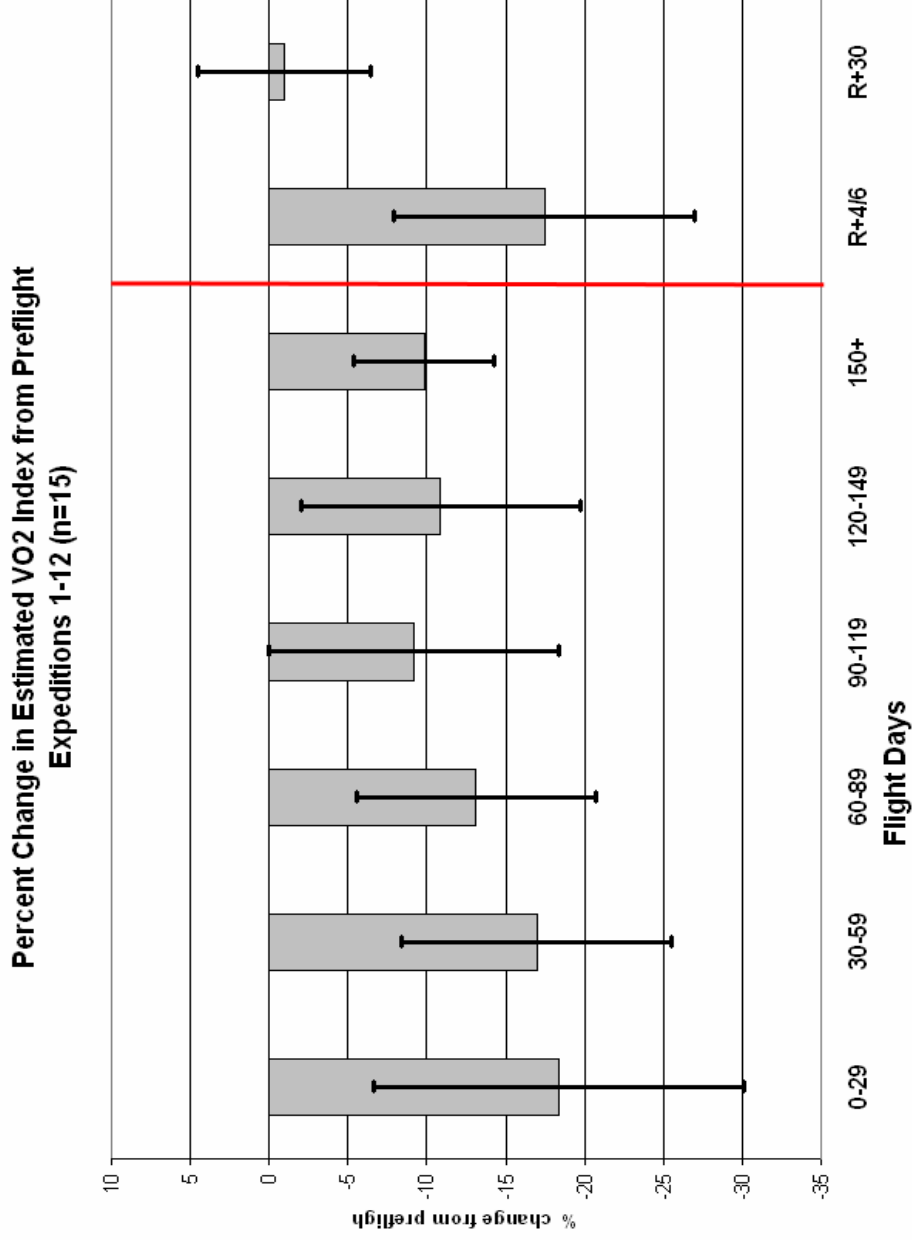
Pre-flight Aerobic Fitness of ISS Astronauts

Pre-flight Aerobic Fitness





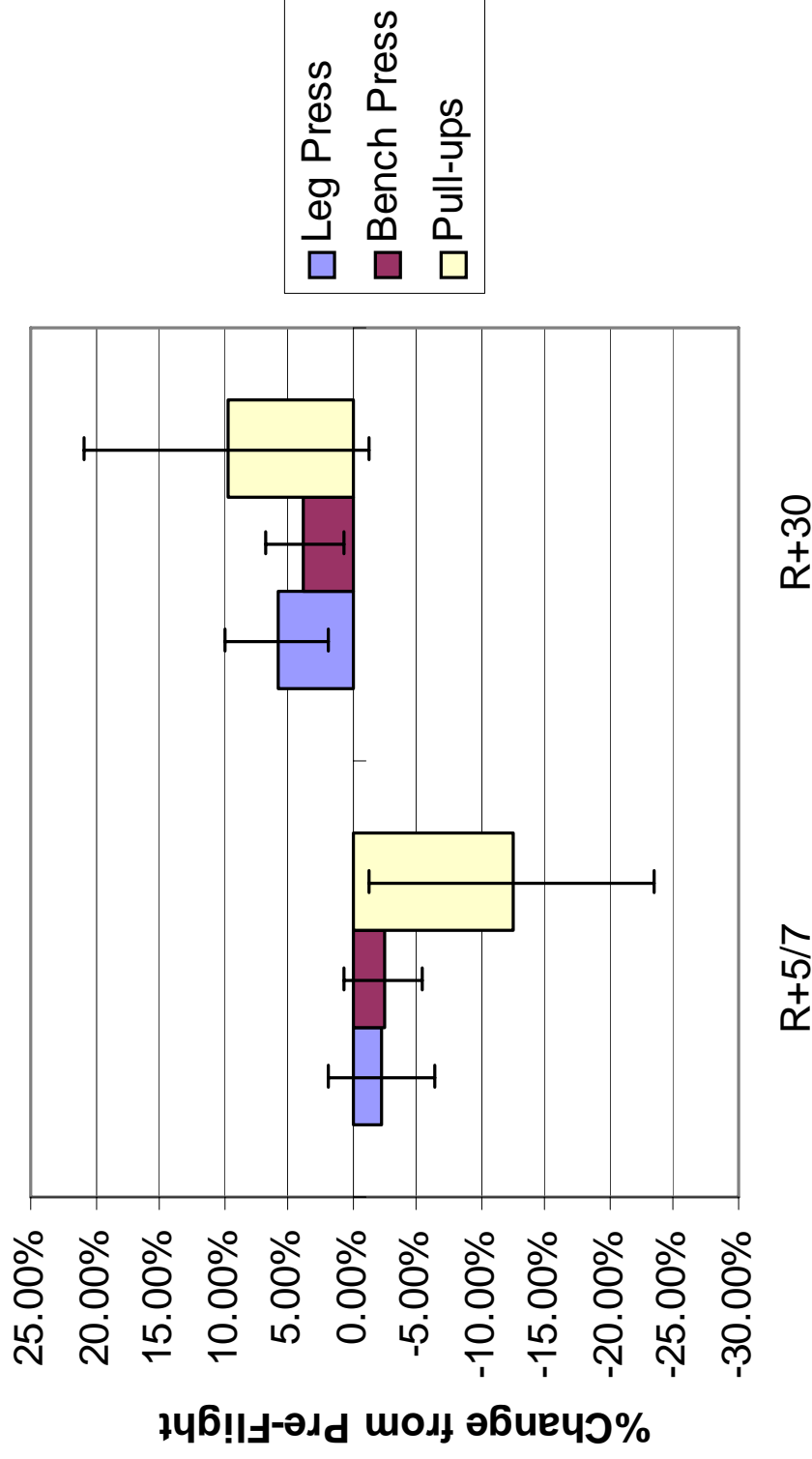
In-flight and Post-flight Aerobic Capacity of the Astronaut Corps





ISS Functional Fitness Expeditions 1-12

Strength and Endurance





ISS Functional Fitness Expeditions 1-12

Strength and Flexibility

